WATER RESOURCES RESEARCH GRANT PROPOSAL

Project ID: AK 3461

Title: Fingerprinting organic material in the Caribou-Poker Creek Watershed to support hydrologic investigations

Focus Categories: Hydrology, Groundwater

Keywords: permafrost, organic chemistry, hydrology

Start Date: 03/01/2001

End Date: 03/01/2003

Federal Funds Requested: $18,359

Non-Federal Matching Funds Requested: $13,659

Congressional District: AK

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Abstract

The Caribou and Poker Creek Watershed (CPCRW) is an important component of the Bonanza Creek LTER (Long Term Ecological Research) Program. The CPCRW serves as a testbed for process studies on interactions between hydrology, meteorology and permafrost.

By characterizing the nature and origin of organic matter in water below or above permafrost, in interpermafrost springs and in streams, we seek to better describe the influence of permafrost on the hydrology in this region. In addition to a better understanding of the hydrology of permafrost watersheds in general, understanding the origin of organic matter is important for drinking water treatment and use. Many public drinking water systems in Alaska extract water from above and below permafrost. Depending on the origin of the organic matter, certain health risks may be present.

Natural organic matter (NOM) in drinking water is a health concern because it contributes to the formation of disinfectant by-products (DBPs) such as trihalomethanes (THMs) and haloacetic acids (HAAs). NOM causes other health, economic, and aesthetic problems since contaminants such as metals, hydrophobic organic chemicals, and radionuclides can be transported by NOM.

NOM in water from the CPCRW will be fingerprinted using pyrolysis-G/MS. Fingerprint analysis will be used to estimate the origin of surface water contributing to groundwater and vice versa during different seasons. The information will be used to estimate the 0 j 0 0.14 Tc iace ds in e tr ofde CPCRt